(continued from page 1 - Contrail Science)

temperature and humidity are key factors affecting contrail formation. Since both of these factors undergo daily and seasonal changes, contrails may or may not form over a given location.

Research aircraft captures this picture of contrails forming behind a commercial jet at 35,000 feet.

So why are scientists interested in contrails? Clouds are the largest variable controlling Earth's atmospheric temperature and climate. Any increase in global cloud cover will contribute to long-term changes in Earth's climate. Likewise, any change in Earth's climate may have effects on natural resources. Contrails produce an increase in the Earth's cloudiness. We can now clearly understand that while contrails do not pose a direct threat to humans, the need for contrail research exists to address long-term changes in climate. Scientists are most interested in persistent contrails because they form clouds that would not normally have formed in the atmosphere. Persistent contrails can last for hours and spread, becoming indistinguishable from naturally occurring cirrus clouds. Student observers can collaborate with scientists by observing contrail cover in their area and reporting on the amount and type of contrails present. Persistent contrails are currently estimated to cover about 0.1% of the Earth's surface (note the predominant gray area in figure 1). It is estimated that this will increase considerably over the next four decades (note the increase in dark areas over the US, Europe and Asia – see figure 2). Now that you have a better understanding of contrails, you can appreciate the need for global research on contrails. For more information about this article visit the EPA website at: http://www.epa.gov/otaq/regs/nonroad/aviation/contrails.pdf

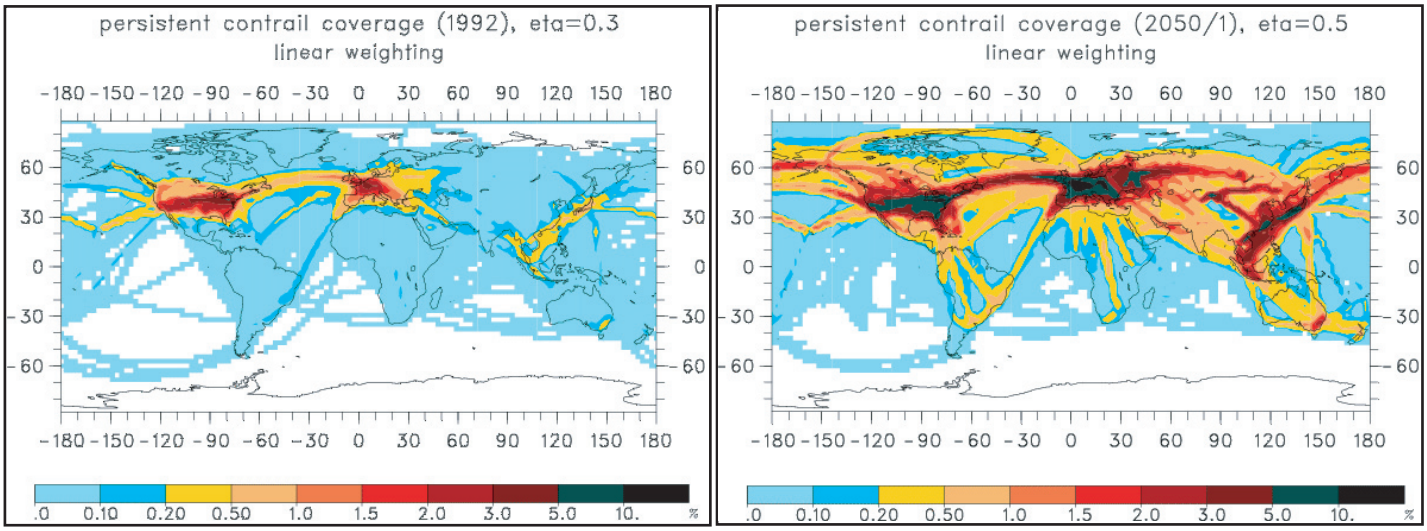

Fig. 1 & 2. Comparison of estimated global contrail coverage between 1992 and 2050. Air traffic and persistent contrail coverage are predicted to continue to increase. By 2050, the warming due to contrails may be 2.5 to 25 percent of the current greenhouse gas warming.

Contrails' Worth of Websites

Contrail Education: http://asd-www.larc.nasa.gov/GLOBE/
Find answers to many of your contrail questions at the most complete contrail website supported by NASA researchers. This website is loaded with information about contrail research and resources. For a more complete description of this website, check out page 7 of this newsletter.

S'COOL Project: Students' Cloud Observations On-Line: http://scool.larc.nasa.gov
S'COOL is a unique hands-on project that involves students in collaborative research with NASA scientists on Earth's climate. Science, math and geography are used as students observe, compute and locate vital information through groud truth observations for the CERES instrument on board several NASA satellites.

GLOBE Program: http://www.globe.gov
GLOBE is a worldwide hands-on, primary and secondary school-based education and science program. For students, GLOBE provides the opportunity to learn by taking scientifically valid measurements, reporting data and collaborating with scientists. For teachers, GLOBE provides training workshops, teacher's guides, videos and other materials.

Earth Observatory: http://earthobservatory.nasa.gov/
The purpose of NASA's Earth Observatory is to provide a freely-accessible publication on the Internet where the public can obtain new satellite imagery and scientific information about our home planet. The focus is on Earth's climate and environmental change. Many of the materials published on the Earth Observatory are freely available for re-publication.